Operators Manual

For DM300 S-VDR and DM500 VDR

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1.0	September 2006	Original issue of document
1.2	March 2007	Minor errors corrected

Contents

1 Scope and purpose

Operators Manual for DM300 S-VDR and DM500 VDR

1.1 References

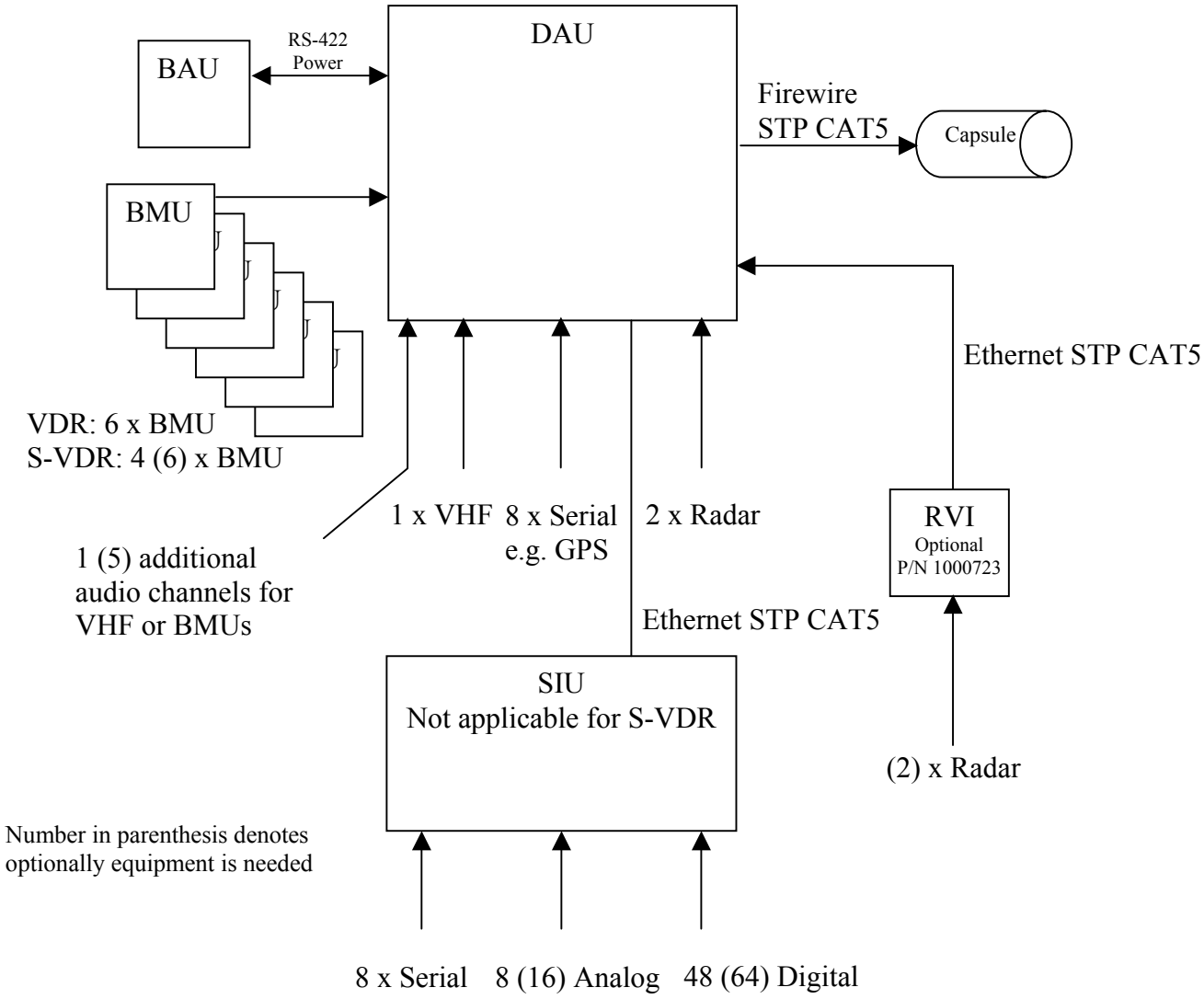
9200238	Installation manual for DM300 S-VDR and DM500 VDR
9200327	Installation manual for DM500 VDR Sensor Interface Unit
9200328	Operators Manual for DM300 S-VDR and DM500 VDR
9200331	Installation manual for DM300 and DM500 Remote Video Interface
9200343	Inspectors and Authorities Manual for DM300 S-VDR and DM500 VDR

1.2 Terms and Abbreviations

BAU	Bridge Alarm Unit
BMU	Bridge Microphone Unit
DAU	Data Acquisition Unit
DPU	Data Processing Unit (located inside the DAU)
SIU	Sensor interface unit
RVI	Remote Video Interface

2 System overview

System overview for DM300 S-VDR and DM500 G2VDR:



System overview

2.1.1 Data Acquisition Unit

The Data Acquisition Unit contains the Data Processor Unit (DPU) and the Power Supply Unit (PSU). The DAU must be installed indoors near the bridge.

2.1.2 Bridge Alarm Unit (BAU)

The BAU must be installed on the bridge either in a console or mounted on a bulkhead. System errors will generate a visual and audible alarm.

2.1.3 Bridge Microphone Units

A number of BMUs must be installed on the bridge (console, ceiling or bulkhead mounted). Watertight outdoor BMUs for the bridge wings are available.

2.1.4 Data Capsule

The data capsule ("the orange box") must be installed on an "external deck close to the vessels center line" typically on the external deck above the bridge.

2.1.5 Sensor Interface Unit (SIU)

The Sensor Interface Unit is not part of a S-VDR system. The SIU contains up to 8 additional serial interfaces, 16 analog interfaces and 64 digital interfaces. The SIU is needed for most VDR systems since more data has to be recorded. The SIU must be installed indoors and must be connected to the DAU with a cable up to 100m long.

2.1.6 Remote video interface (RVI)

The optional Remote Video Interface extends the number of video interfaces from 2 to 4. The RVI must be installed indoors and must be connected to the DAU with a cable up to 100m long.

3 Operation

3.1 Bridge alarm Unit

The BAU is the primary user interface for an installed operational VDR. It serves two purposes:

- Alarm display
- Interface for initiating backup

3.1.1 Alarm display

The VDR will generate an alarm message if a system error is detected. The alarm messages will be displayed on the BAU. An audible alarm will be generated with each new alarm. The audible alarm can be muted by pressing ACK. The error LED will be illuminated as long as there is any error in the system, the cause of the error(s) will be displayed in the LCD display.

3.1.1.1 Protection against intermittent errors

Intermittent errors can be very annoying. The VDR will regard a system component or a data source that fails 3 times within 12 hours as a permanent failure i.e. that system component/data source will not be able to generate more audible alarms. A permanent visual alarm will be displayed instead and the VDR will still try to recover from the problem e.g. record data even if they contain many errors. Repetitive alarms are marked with an "R" after the error code.
The "repetitive" error status for a failed system component/data source will be automatically reset if no error is generated for 12 hours. The "Purge List" button on the BAU will force reset error status for all system components/date sources.

3.1.1.2 Dimming

The button with the light bulb symbol may be used to alter the luminance of the keyboard, error LEDs and the LCD display simultaneously.

3.1.2 Means for initiating a backup

The VDR system is only guaranteed to record data for twelve hours i.e. important data may be overwritten after twelve hours unless a backup of data is made following an incident.
The crew on the bridge must initiate the backup procedure shortly after the ship has been involved in an incident or if an incident involving other vessels is observed.

The backup procedure is started when the two "Save" buttons are pressed simultaneously for more than 3 seconds. The VDR is capable of making the backup within seconds.

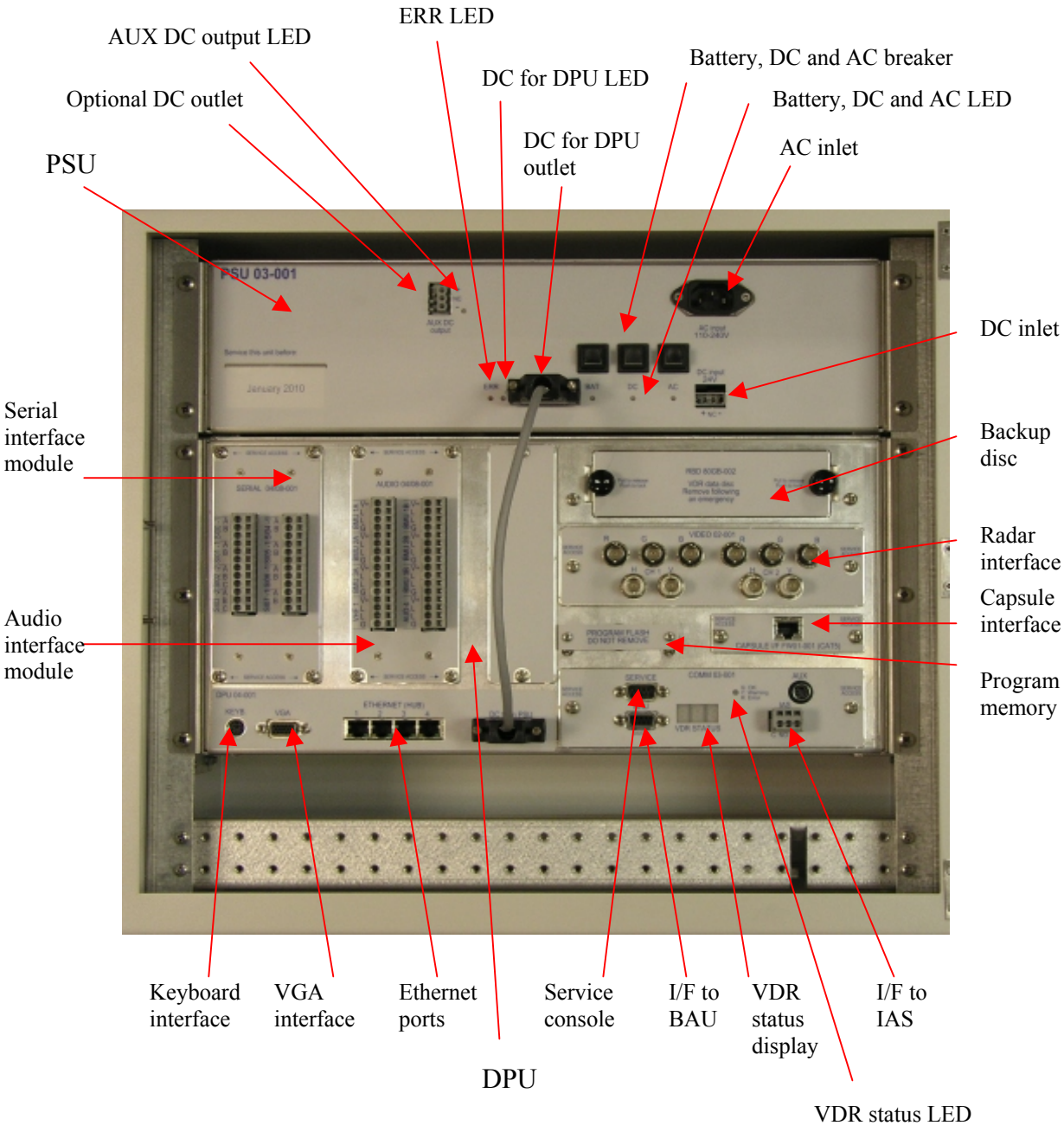
The system is capable of storing three incidents. The "Save" LED indicates when there is one or no save opportunity left (disk full). A backup will be protected for 30 days after which the space on the disc will be released automatically.

This backup disc must be replaced if it becomes full (which is unlikely under normal circumstances). Alternatively, data from the disc must be transferred to another media and space on the disc can be manually released. This requires proper authorization and cannot be done from the BAU.

The backup disc, which is easily removed from the DAU, must be retrieved if the ship is abandoned after a serious incident.

4 Operation DAU

The door to the DAU must be locked after the VDR is installed and operating normally. This section of the manual is only relevant during installation and service or if the backup disc has to be removed following a serious incident.



Data Acquisition Unit (DAU)

4.1 LEDS on PSU

BAT LED (blue)

Steady light	Battery fully charged	OK
Blinking	Charging battery	OK
Off (short flash every 10 seconds)	Battery is disconnected or has failed	Error

AC LED (blue)

Steady light	AC power OK	OK
Off	AC power failed	Error

DC LED (blue)

Steady light	DC power OK	OK
Off	DC power failed	Error

ERR LED (red)

Steady light	The PSU has failed	Error
Flashing 2,5Hz	An output has been short-circuited or no load on the “DC for DPU” output is detected. The PSU may remain in this state for up to one minute after the problem has been fixed.	Error
Off	The PSU is operating	OK

DC for DPU LED (blue)

Steady light	Power to DPU present	OK
Off	No power to the DPU	Error (note 1)

AUX DC output LED (blue)

Steady light	Optional DC present	(Note 2)
Off	No optional DC present	(Note 2)

Note 1) will be off for a few seconds after power on.
Note 2) the optional DC output is disabled and this led will therefore be off.

4.1.1 Battery, DC and AC breaker

The Battery, DC and AC breaker is a combination of a fuse and a manually operated switch, i.e. they can be used to manually switch off power sources but they will also pop out automatically if too much current is drawn from a power source. The PSU is protected by sophisticated electronic circuits and fuses, which serve as secondary protection.

Warning: All three breakers must be released (popped out) to switch the PSU fully off

4.1.2 AC inlet

The main power source for the VDR is ships AC (110V-240V).

4.1.3 DC inlet

The VDR must be connected to the ships emergency power source (V24V DC) if the emergency power system is based on DC.

4.1.4 DC to DPU

The PSU and the DPU is connected with a cable. DC is supplied to the DPU through this cable. This cable also carries bi-directional communication between the PSU and the DPU.

Warning: The cable between the DPU and PSU must NOT be connected or disconnected while the PSU is on i.e. all power sources must be switched off and the blue "DC for DPU" LED must be off.

4.2 DPU

The DPU is the main computer in the system. It is basically a PC, but it has been designed from scratch in a completely different manner to withstand environmental stress that far exceeds what an ordinary industrial PC can sustain.

4.2.1 VDR status display and VDR status LED

The status of the system is displayed using three digit codes on the VDR status display. The VDR status LED shows the severity of the codes. All information that is displayed on the VDR status display will also be displayed on the BAU after the system is booted and if the BAU is operational. The BAU is able to display an additional text massage in conjunction with the status codes since the BAU features an alphanumeric LCD display. There is no reason to consult the VDR status display if the BAU is operational.

VDR status LED (tri color)

Steady Green	Any information displayed is just information	OK
Steady Yellow	Any information displayed is warnings The system is still fully operational but may fail soon. Service is needed.	(OK)
Steady Red	Any information displayed is about system errors that prevent normal operation. Service is needed immediately.	Error

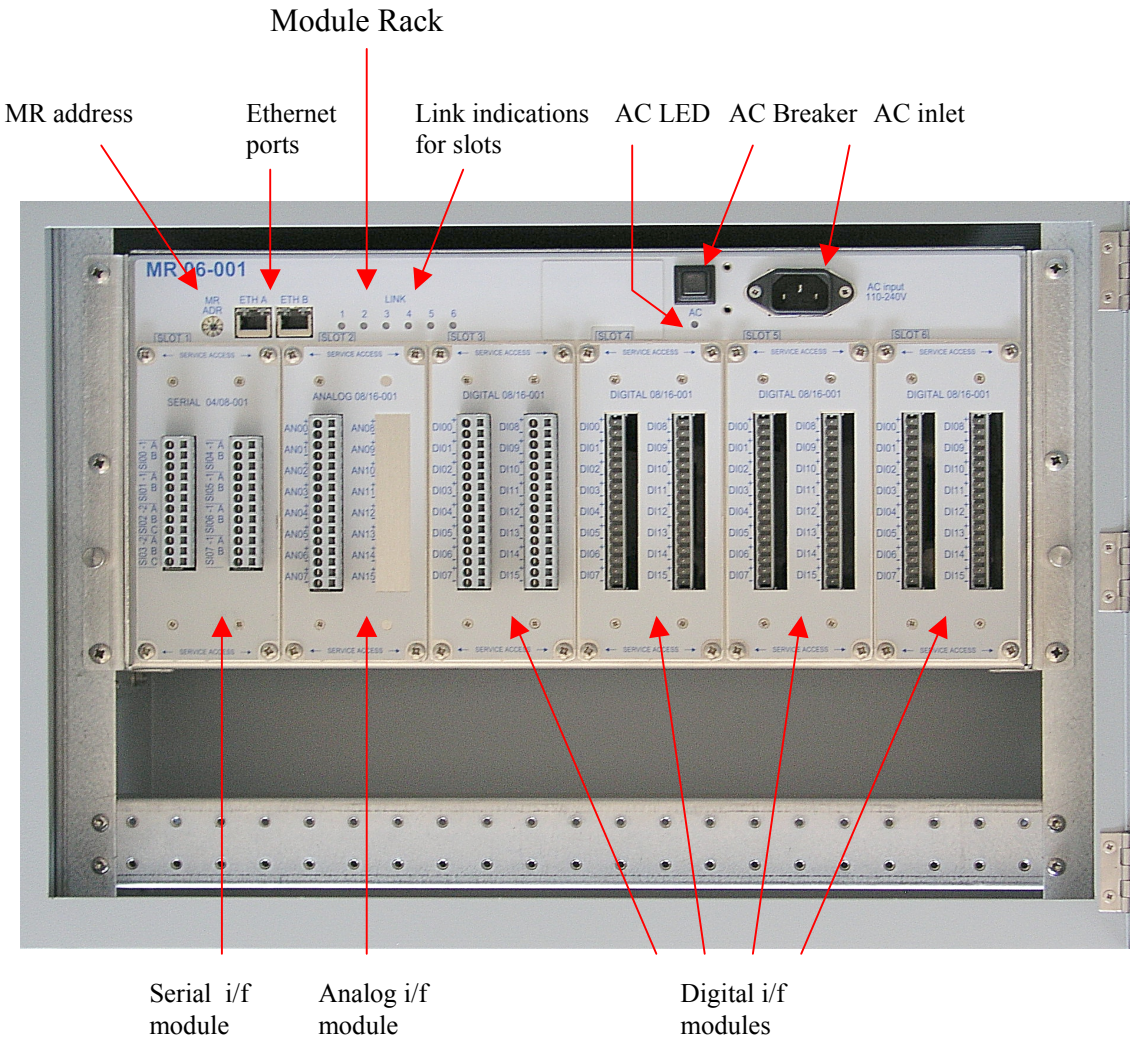
4.2.2 VDR status display Error codes

See section 6

4.2.3 LEDs in the Ethernet connectors

Two LEDs are integrated into each Ethernet connect. The left LED (yellow) will be illuminated when a communication link is established. The right LED (green) will flicker depending on the traffic load.

5 Operation of SIU



Module Rack with six modules

5.1 LEDs on Module Rack

5.1.1 AC LED

Indicates the power (AC) is present.

5.1.2 Link indications

Indicates that the Module Rack has detected a module in this slot.

5.1.3 AC beaker

The AC breaker is a combination of a fuse and a manually operated switch, i.e. it can be used to manually switch off the power source but it will also pop out automatically if too much current is drawn from the power source.

5.1.4 LEDs in the Ethernet connector

Two LEDs are integrated into each Ethernet connect. The right LED (yellow) will be illuminated when a communication link is established to the DAU. The LED will flicker depending on the traffic load. The left LED is not used. Please not that the behavior of the LEDs is different on other parts of the system e.g. the DAU.

5.1.5 Modules

The Module Rack accommodates up to six modules.

Slot 1 is reserved for a Serial I/F module
Slot 2 is reserved for an Analog I/F module
Slot 3-6 is reserved for Digital I/F modules

Unused modules may be omitted.

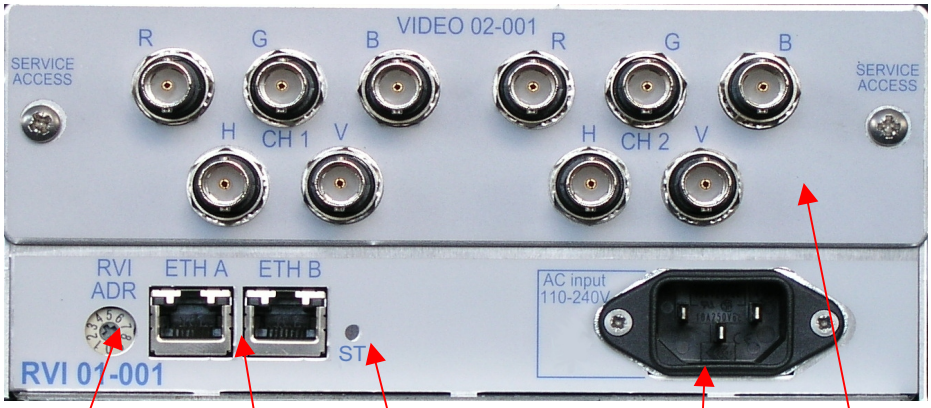
5.1.6 Allocation of system labels for digital interfaces

	Card number in VDR configuration	Interface number in VDR configuration and VDR Explorer
Digital I/F module in Slot 3	1	DI00 – DI15
Digital I/F module in Slot 4	2	DI16 – DI31
Digital I/F module in Slot 5	3	DI32 – DI47
Digital I/F module in Slot 6	4	DI48 – DI63

5.1.7 MR address

Must be set to “0”.

6 Operation of RVI



RVI address Ethernet port ST LED AC inlet Video i/f module

6.1.1 RVI address

Must be set to “0”.

6.1.2 Ethernet ports

ETH A must be connected to the DAU. Note that the LEDs in the Ethernet connectors (RJ45) are inactive for this unit.

6.1.3 ST LED

The Status LED (Yellow) will flash (1Hz) after power on and then become steady if a communication link is established to the DAU. The LED will always be switched off after one minute.

7 Error codes

Error codes and messages will be displayed by the BAU and VDR status display when errors are detected. An “R” in front of the error code denotes a repetitive alarm se section 3.1.1.1.

7.1 General Error code for S-VDR and G2VDR

004	Fatal system error	The VDR has encountered unrecoverable system error. Reboot the system. If the error persists call for assistance. The most probable cause is a faulty CPU board or system RAM
006	Startup failure	The VDR has encountered unrecoverable system error during startup. Reboot the system. If the error persists call for assistance. The most probable cause is a faulty CPU board, system RAM or boot flash
008	Poll error	An internal software error. If the error persist call for assistance. The most probable cause is a faulty CPU board, system RAM or a software error.
014	System could not find capsule	The communication to the capsule is interrupted. Check that the cable is connected to the DPU. Reboot the system, if the error persists call for assistance. The most probable cause is a defective cable, or a faulty repeater. The repeater in the DPU is easily replaced. Only trained service technician are authorized to replace the repeater in the capsule.
016	Time difference is too big	The difference between the current UTC time and revived UTC time is too big. The most probable cause is that a faulty NMEA string has been received from the GPS. Make sure that the serial line to the GPS is made correctly and the use of checksum is enabled.
018	Storage failure	Internal software error. Call for assistance.
024	Capsule index error	The file index in the capsule is corrupted. Try to repair (clear) the index.
030	BAU Comm. Error	The DPU is unable to communicate with the BAU. Check the cable from the DPU to the BAU. Reboot the system, if the error persists call for assistance. The most probable cause is a faulty cable, BAU or COMM module in the DPU.
036	Unable to save configuration	The VDR was unable to save the configuration. Please retry. This error is only expected to occur during configuration (installation) of the system.
042	CONFIG failure	The VDR is unable to find any configuration at all. Replace the boot compact flash in the DPU (a properly made boot flash contains a default configuration from which the system can start). Restore a backup of the configuration.
054	Running on battery	The system is running on battery. Both the main power and the emergency power are absent. If there is a general power failure on the ship then ignore (ACK) this message else check the power supply in the DAU. Consult section 4.1 for details.
056	Microphone test failed	The microphone test failed. Force a microphone test (this a feature in the VDR configurator under AUDIO settings). This test will reveal

		which microphone causes the problem. Check that the "BMU active" checkbox is unchecked for non-existing microphones. Check the cable to microphones reported as faulty. Test the inputs on the audio interface module with a spare microphone. Replace microphones that are reported faulty if no other error is discovered.
060	UTC timeout	The system receives no UTC from the GPS. Check that GPS is on. Check the signal from the GPS (use serial monitor in VDR explorer, WEB status or VGA status display). If no signal is present check cable else check that configuration is made correctly)
070	PSU comm. missing	The communication between the power supply and DPU is interrupted. Check the cable between the PSU and the DPU. If the error persists call for assistance. The most probable course is a problem with the cable or a faulty serial transceiver in the DPU or PSU.
072	(Not displayed on BAU)	Self-test failed. This error is only displayed on the VDR status display. The ETX board is faulty and must be replaced.
074	Serial board missing	The serial data interface module cannot be detected. If the error persists call for assistance. The most probable cause is that the internal cable is faulty/disconnected or that the serial interface module is faulty.
076	Video board missing	The video data interface module cannot be detected. If the error persists call for assistance. The most probable cause is that the internal cable is faulty/disconnected or that the video interface module is faulty.
078	Audio board missing	The audio data interface module cannot be detected. If the error persists call for assistance. The most probable cause is that the internal cable is faulty/disconnected or that the audio interface module is faulty.
080-086	Radar n No Input	There is no input from the radar. Check the radar and the cable. Enter the video calibration menu for that channel and examine the image. Unused video channels must be configured inactive (the Active parameter must be unchecked).
088-094	Radar n Image to big	The Radar image exceeds the allocated space in the capsule and the system is therefore unable to record for 12hours. Check the radar image for noise. Check the calibration of the video channel. Reduce the number "color mask bits" if needed.
096	Not configured Configure SVDR	The VDR has started on the default configuration. Configure the system correctly. The VDR is unable to operate correctly on the default configuration since at least the GPS antenna position and vessel ID must be entered.
098	Capsule Not recording	The system is unable to record data in the capsule. Another error explaining why (e.g. #010 Capsule failed) is normally displayed in advance. Try to fix the preceding error or else reboot system. If the error persists call for assistance.
100	Backup Disc Not recording	The system is unable to record data to the backup disc. Another error explaining why (e.g. #010 Backup disc failed) is normally displayed in advance. Try to fix the preceding error or reboot the system. If the error persists call for assistance.

102	Video Interface Power failure	The Video Interface board in the DPU is using too much power. The board is faulty and must be replaced.
104	Audio Interface Power failure	The Audio Interface board in the DPU is using too much power. The board is faulty and must be replaced.
106	Serial Interface Power failure	The Serial Interface board in the DPU is using too much power. The board is faulty and must be replaced.
108	Video Interface Not Started	The Video Interface board in the DPU did not start. Wait three minutes; maybe the VDR is able to recover restarting the interfaces else try to reboot the system. If the error persists the board is faulty (or wrong type) and must be replaced.
110	Audio Interface Not Started	The Audio Interface board in the DPU did not start. Try to reboot system if the error persists the board is faulty (or wrong type) and must be replaced.
112	Serial Interface Not Started	The Serial Interface board in the DPU did not start. Try to reboot system if the error persist the board is faulty (or wrong type) and must be replaced.
114	Remote Backup Not Recording	The VDR is able to send data to an external system for e.g. extended backup. This error is displayed the communication the external system has failed. The VDR is still fully functional even if this error is displayed. Please refer to the manuals for the external system.
116	System could not find Backup Disc	The communication to the backup disc is interrupted. Check that the backup disc is installed correctly in the DPU and locked. Reboot the system, if the error persists call for assistance. The most probable cause is a defective disc.
118	PSU battery Not present	The power supply is unable to detect the battery pack. Check that the fuse/breaker on the PSU named ”BAT” is pushed; see section 4.1.1. If the error persist after 5 minutes call for assistance.
120	PSU battery Could not be charged	The PSU was unable to fully charge the battery within a specified time. Release the fuse/breaker on the PSU named ”BAT” for 5 seconds, then push it in again see section 4.1.1. If the error returns (this may take 18hours) call for assistance i.e. the battery pack is defective and needs replacement.
122	PSU battery Temp. sensor missing	A temperature sensor for the battery pack is disconnected or broken Call for assistance, the PSU needs repair.
123	(Never displayed on BAU)	Alarm system under initialization. Displayed shortly after system startup.
124	PSU Low output voltage	The output voltage from the PSU has dropped below 19V. This message will appear shortly before the battery is discharged when operating from the internal battery only. This message will not appear if the battery is new and was fully charged since the VDR will power down automatically after two hours when operating from the batteries (well before the voltage drops below 19V). If AC power or DC power is present (and the AC and DC fuse/breaker are pushed) while this error is displayed call for assistance, the PSU needs to be repaired.
126	PSU Error	Call for assistance, the PSU needs to be repaired.

128	AUDIO board 2 not present	This will only happen if Audio track 5 is enabled in the configuration. Audio card two (the half slot module) is defective or internally disconnected (check cable) inside DPU.
130 132 134	xxxxxx Board duplicate	xxxxxx = Audio, Serial, Video Two boards with identical system locations have been detected. Restart the system. If the error persist call for assistance.
136 138 140 142 144	xxxxxx Wrong rack type	xxxxxx = Serial, Analog, Digital, Video, Audio A module is located in a rack (DPU, SIU or RVI) where it is not supposed to be. Check the installation. Call for assistance if no error is found.
146	AUDIO board 2 not started	The optional audio module (half slot) did not start. If it is not installed, audio channels 5 in the configuration must be disabled or else check the cable from the baseboard in the DPU to the module. Restart the system; if the error persists replace the module.
148	DAU SERIAL Module in wrong slot	The serial module must be located in slot 1 in the DPU. Check the position of the module or that the internal cables in the DPU are not crossed.
150	DAU AUDIO Module in wrong slot	The eight-channel audio module must be located in DPU slot 2 and the four-channel audio module (if present) in DPU slot 3. Check the position of the modules or that the cables for the modules inside the DPU are not crossed.
152	DAU VIDEO Module in wrong slot	The video module must be located in slot 4 (the horizontal slot). Check that the cables for the modules inside the DPU are connected straight.
154	Capsule Data Data record to big	The amount of data received by the VDR exceeds the capacity in the capsule. The most probable cause is that the VDR is unable to compress the radar images due to noise or other errors, or that the VDR is configured to record images from multiple high resolution radars.
300-307	Serial timeout ch x	A mandatory serial signal has disappeared. Check that the source is on. Check the signal from source (serial monitor in VDR explorer, WEB status or VGA status display). If no signal is present check the cable or that the configuration is correct.
980	BAU and DPU not compatible	The software in BAU is incompatible with the software in the DPU.
400-499	Error codes related to a VDR only	See Section 7.2
550	Storage Dataset incomplete	One or more types of data are not recorded. If the error persist then restart the VDR and report this error if it is repeated.
901-923	System Failure Error 901-923	The software is not working properly. Restart the VDR and report this error if it is repeated.
981	No communication to DPU	The BAU has never been able to communicate with the DPU. The most probable cause is a defective cable or that the VDR did not boot correctly.
982	No communication to DPU	Initial communication was ok but the communication has failed later. The most probable cause is that the VDR encountered a fatal error

		and completely stopped. Restart the system, if the error persists call for assistance.
999	(Never displayed on BAU)	The system is booting the VDR application from the boot flash.
---	Time, VDR	No errors detected

7.2 Additional Error codes for G2VDR installations

400- 407	SIU slot 1 Serial timeout ch x	A mandatory serial signal has disappeared. Check that the source is on. Check the signal from the source (serial monitor in VDR explorer, WEB status or VGA status display). If no signal is present check the cable or that the configuration is correct.
441- 446	SIU slot n Missing xx module	n = 1 … 6. xx = SI (serial), AN (analog), DI (digital) **If only one module is affected:** A module in the SIU has been removed or has failed. Check that the module is installed correctly; the blue "link" LED for the module must be illuminated. If the LED is already illuminated switch the power to the SIU off and on. If the error persists replace the module. **If all modules are affected:** Check the power to the SIU Check the cable from the SIU to the DAU and link status, see section 4.2.3 and 5.1.4. If no error is found, try to restart both the DAU and the SIU (power off and the on) If the error persist call for assistance, the DPU or the Module rack is probably defect
450- 453	SIU xxxxxxx Module in wrong slot	xxxxxxx = Serial, Analog, Digital, Video A module has been misplaced in the module rack. Install the modules as shown in section 5.1.5.
460- 463	SIU xxxxxxx Wrong MR address detected	xxxxxxx = Serial, Analog, Digital, Video An SIU with the wrong Module Rack address has been detected. Set the MR adresss to 0. See section 5.1.5.
470- 472	SIU Duplicate xxxxxxx module	xxxxxxx = Serial, Analog, Digital The VDR had detected two different modules with the with the same MR address, slot number. This may occur if two SIUs are connected to the DAU, which is an invalid configuration.
480	Image Illegal conf	Recording of radar images to the DRU has been disabled which is unacceptable for a VDR installation. The system configuration must be changed, consult the installation manual.
482	RVI Video board not present	The VDR is unable to detect the second video module (which is located in the RVI). Check the connection between the DPU and the RVI. Check the RVI, the Video Acquisition Module and the internal cable between the RVI baseboard and the Video Acquisition Module.
484	RVI VIDEO Wrong RVI address	The RVI address is wrong. Set the address to "0". The RVI address is determined by the small rotary switch on front of the RVI, se section 6

8 Service and maintenance

The VDR requires an annual inspection carried out by a certified service organization. Please refer to “Installation Manual for DM300 S-VDR and DM500 VDR” for further details.

8.1 List of spare parts

S-VDR	1000712
VDR	1000713
Major Parts	
Basic S-DAU	1000714-2
Sensor Interface Unit	1000717
BMU (MIC) indoor	1000721
BMU (MIC) outdoor	1000722
Bridge Alarm Unit	1000720
Fixed Capsule	1000718
Installation kit	2000696
S-VDR program code on CF flash	7000751
VDR program code on CF flash	7000752
VDR Explorer on CD	7000735
Manuals	9000737
Manuals for VDR (complete set incl. 9000670)	
Boxes in DAU	
DPU	1000610-2
PSU	1000611-2
Box inside SIU	
Module Rack w. standard configuration	1300394
Remote Video Interface	
Remote Video Interface	1000723
Modules in DPU or SIU	
Serial 08-001	2000621
Audio 08-002	2300108
Audio 04-002	2300109
Video 02-002	2000646-2
RBD 80GB-002	2000647
COMM 03-001	2000649
FW 01-001	2000650
FW 01-002	2300308
ANALOG 08-001	2000629
ANALOG 16-001	2000630
DIGITAL 16-001	2000633
Miscellaneous parts	
Beacon	3000671

Clamps for beacon	3000672
Cradle for capsule	2000673
Cable from PSU to DPU	3000674
Spare DPU with no modules (baseboard and all cables included)	2000680
Battery pack for PSU p/n 1000611	2000685
DPU base board (spare)	2000686
Internal cable set for DPU (spare parts)	2000687
Fan for DPU	2000688
Fan for PSU	2000689
New lock for DAU	2000690
Empty compact flash (64M)	2000691
Capsule wo. cradle and beacon	2000693
Straps for capsule release mechanism	4300013
Spare Module Rack wo. modules	2000613
Spare RVI wo. Video module	2000754